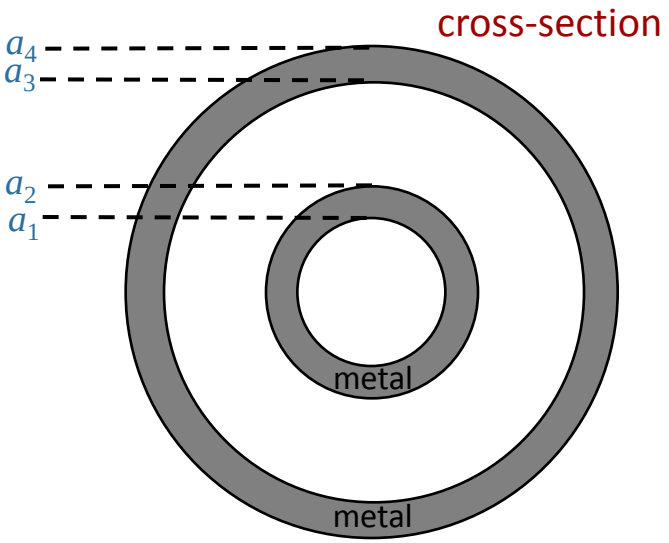
Calculation



A capacitor is constructed from two conducting cylindrical shells of radii a_1, a_2, a_3, and a_4 and length L $(L >> a_i)$.

What is the capacitance C of this capacitor ?

➢ Conceptual Analysis:

$$C \equiv \frac{Q}{V}$$

But what is Q and what is V ? They are not given?

➢ Important Point: C is a property of the object! (concentric cylinders here)

- Assume some Q (i.e., $+Q$ on one conductor and $-Q$ on the other)
- These charges create E field in region between conductors
- This E field determines a potential difference V between the conductors
- V should be proportional to Q; the ratio Q/V is the capacitance.